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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/842,631	04/27/2001	Wendong Zhen	925-192	8827

7590 03/01/2002

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EXAMINER

DIAZ, JOSE R

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 03/01/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/842,631

Applicant(s)

WENDONG ZHEN

Examiner

José R. Díaz

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 July 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 23, 24 and 28 is/are pending in the application.
- 4a) Of the above claim(s) 1-22, 25-27 and 29 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 23, 24 and 28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2. 6) ☐ Other:

DETAILED ACTION

Election/Restrictions

- Restriction to one of the following inventions is required under 35 U.S.C. 121:
- I. Claims 1-22, 25-27 and 29, drawn to the method of making a semiconductor device, classified in class 438, subclass 3.
 - II. Claims 23-24 and 28, drawn to a semiconductor device, classified in class 257, subclass 1+.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case unpatentability of the group II invention would not necessarily imply unpatentability of the group I invention, since the device of the group II invention could be made by processes materially different from those of the group I invention, for example the crystal grain structure can be made dissimilar by depositing the layers at different temperatures rather than by separate steps of depositing the layers and then heat treating.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with H. Warren Burnam Jr. on January 10, 2002 a provisional election was made without traverse to prosecute the invention of Group II, claims 23-24 and 28. Affirmation of this election must be made by applicant in replying to this Office action. Claims 1-22, 25-27 and 29 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Priority

➤ Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 103

➤ The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

➤ Claims 23-24 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogata et al. (JP 10-321809) in view of Suh (US Patent No. 6,338,970 B1).

Regarding claims 23-24 and 28, Ogata et al. teach a semiconductor device (see Figs 1a-4c) comprising: a lower electrode (4) on a substrate (1); at least three ferroelectrics thin layers (6-8); and an upper electrode (9) (see Figs 1a-4c). However, Ogata et al. does not teach the limitation wherein the crystal grain of the uppermost and

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lowermost layers of the ferroelectrics thin film is smaller than the crystal grain of the intermediate layer of the ferroelectrics thin film. Suh teaches that is well known in the art to form at least one ferroelectrics thin layer comprised two portions (22, 23), wherein one of the portions (23) is denser than the other portion (22) and has a crystal grain smaller than the other portion (22) (see col. 2, lines 57-67 and col. 3, lines 1-18). Therefore, it would have been obvious to one having ordinary skill in the art at the same time the invention was made to modify Ogata et al. to include a ferroelectrics thin film comprised of at least three layers, wherein each layer comprise an upper and a lower portions having different grains size such that the lowermost and the uppermost layers of the at least three layers include grains which are smaller in size than those on the lower portion of the intermediate layer. The ordinary artisan would have been motivated to modify Ogata et al. in the manner described above for at least the purpose of improving the surface roughness and quality of the thin film.

Claims 23-24 and 28 rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Yokoyama et al. (US Patent No. 5,998,819).

Regarding claims 23-24 and 28, Yokoyama et al. teach a semiconductor device (see cols. 1-18) comprising: a lower electrode (4) on a substrate (1); at least three ferroelectrics thin layers (5); and an upper electrode (6) (see Figs 1 and 10a-11, Table 2, col. 6, lines 10-64, and col. 8, lines 66-67).

Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to José R. Díaz whose telephone number is (703) 308-6078. The examiner can normally be reached on 9:00 - 5:00 Monday through Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 746-3891 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JRD
February 24, 2002



EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800